SIEMENS

RUGGEDCOM WiN7000

Installation Guide

FCC Statement And Cautions

Introduction 1

Site and Installation Requirements 2

Installation Procedures 3

Setup 4

Troubleshooting 5

Connector and Cable Pinouts A

WiN7000 Specifications B

List of Acronyms C

Warranty D

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Table of Contents

FCC Statement And Cautions v

Chapter 1
Introduction 1
1.1 About this Guide 1
1.2 Capabilities and Features 1
1.3 Safety Information 2
1.3.1 General 2
1.3.2 Power Supply Requirements 2
1.3.3 Equipment Installation 4
1.3.4 Radio Frequency (RF) Exposure 4
1.3.5 Lightning Protection 4
1.3.6 Power Cord Protection 4
1.3.7 Servicing 4
1.3.8 Antenna Grounding Requirements 5
1.3.9 Outdoor Grounding System 5
1.3.10 User ports and power supply 5
1.3.11 Safety Hazards 5
1.4 WiN7000 Physical Specifications 6

Chapter 2
Site and Installation Requirements 7
2.1 Mounting Considerations 7

Chapter 3
Installation Procedures 9
3.1 Pre-Installation Safety Instructions 9
3.2 Package Components and Unpacking 9
3.3 Cat5 Cable Requirements 9
3.4 Installation Tools 10
3.5 Installing the Base Station 10
3.5.1 Sealing Screw 11
3.5.2 WiN7000 Mounting Bracket 11
3.5.3 Pole Mounting 13
3.5.4 Wall Mounting 14

3.5.5 Tower Mount 15
3.5.6 Power and Cable Connections 16
3.5.6.1 PEC (Copper) Type Base Station 16
3.5.6.2 SFA (Optical) Type Base Station 17
3.5.6.3 SFD Type Base Station 19
3.5.7 Grounding the Device 21
3.5.8 Installing the GPS Antenna 22
3.5.9 2.3GHz Band Cavity Filters Installation 23
3.6 Weatherproofing 31
3.6.1 Weatherproofing Cable Connections 32

Chapter 4
Setup 37
4.1 Connecting to the WiN7000 Web Interface 37

Chapter 5
Troubleshooting 41
5.1 No IP connectivity 41
5.2 No Serial Connection 41

Appendix A
Connector and Cable Pinouts 43
A.1 Power and Ethernet Cable Pinouts 43
A.2 Console Cable Pinouts 44

Appendix B
WiN7000 Specifications 45

Appendix C
List of Acronyms 47

Appendix D
Warranty 49

FCC Statement And Cautions

Federal Communications Commission Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION!
Caution: Service

This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void.

Changes or modifications not expressly approved by RUGGEDCOM could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the equipment.

CAUTION!
Caution: Physical Access

This product should be installed in a restricted access location where access can only be gained by service personnel or users who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and access is through the use of a tool or lock and key, or other means of security, and is controlled by the authority responsible for the location.

1 Introduction

The WiN7000 High Power Base Station is a member of the RUGGEDCOM WiN family, a line of mobile WiMAX broadband wireless access systems based on the 802.16e mobile WiMAX standard. RUGGEDCOM systems are designed for robustness and simplicity, offering feature-rich services with low deployment and operation costs.

The WiN7000 is a member of a line of mobile WiMAX broadband wireless access systems based on the 802.16e mobile WiMAX standard. These systems are designed for robustness and simplicity, offering feature-rich services with low deployment and operation costs.

The WiN7000 is a cost-effective solution for wireless access services, designed for point-to-multipoint broadband wireless access applications in varying conditions and locations. It is a one-sector base station.

The base station communicates with fixed and mobile subscriber units, according to defined service criteria and customer service level agreements. The WiN7000 also connects to the service provider backbone, supporting end-to-end Quality of Service (QoS) requirements.

The system uses OFDMA radio technology, providing robustness in adverse channel conditions and enabling Non-Line-Of-Sight (NLOS) operation. This improves coverage and maintains a high level of spectral efficiency. Modulation and coding are continuously adapted to prevailing link conditions, ensuring an optimal balance between robustness and efficiency. The use of STC/MRC and MIMO radio technologies optimizes link performance, ensuring enhanced bandwidth and service coverage.

The RUGGEDCOM WiN7000 is a full outdoor base station, designed for easy installation and mounting on poles, street lamps, towers, or walls. The WiN7000 can be equipped with copper or fibre network interfaces for flexible integration into the operator's backbone.

The WiN7000 is supported by RUGGEDCOM NMS, Siemens's comprehensive Network Management System.

Section 1.1

About this Guide

This installation guides describes the installation of the WiN7000 High Power Base Station.

This guide is intended for use by base station installers and operators, and assumes readers have a working knowledge of WiMAX technologies and procedures. While some safety precautions are reviewed here, it is assumed that installers are trained in safe installation practices. Users unfamiliar with safe installation procedures, WiMAX technologies, and service procedures should not rely on this manual for comprehensive guidance.

Section 1.2

Capabilities and Features

The WiN7000 provides the full base station functionality necessary for serving a single sector:

- All-outdoor, single-box installation
- IEEE802.16e Wave2 Standard Compliance
- Backbone Ethernet connectivity via a 10/100 Base-T network interface

- Fixed and mobile CPE support
- 3.5 MHz, 5MHz, 7MHz and 10MHz channel bandwidth support
- MIMO (2×2) support
- Various Radio Frequency (RF) options, including 1.x, 2.x and 3.x GHz band support
- Traffic classification and connection establishment initiation
- Quality of Service (QoS) management
- Alarm management
- Internal SNMP agent, enabling extensive In-Band (IB) management of the base station and its registered CPEs
- R6 interface to ASN-GW profile C
- Power requirement: 48VDC

Section 1.3
Safety Information

Section 1.3.1
General

- Read this user manual and follow all operating and safety instructions.
- The base station and antenna must be installed by a professional installer.
- Do not exceed the described limits.

Section 1.3.2
Power Supply Requirements

- The power supply unit should be a Class 2 power supply, safety-certified according to national codes.
- Maximum output current should not exceed 5A.
- Maximum output voltage of the power supply should not exceed 60VDC.
- Minimum output voltage should not be below 42VDC.
- The disconnecting device is defined as the following:
  - When connected to an AC/DC power supply, the appliance coupler of the AC/DC power supply is regarded as the main disconnecting device for the base station.
  - When connected to a DC battery power supply, a double pole circuit breaker, rated 10A 60VDC, is regarded as the main disconnecting device for the base station.

The unit is considered to be connected to a centralized DC power system, therefore the power line should be grounded. The unit should be permanently connected to ground with 16AWG cable or less. See the figures below for two methods of power grounding (from the UL 60950-1 standard; according to UL 60950-22). When the unit is connected to a centralized DC Power System, the "+" side of the supply should be grounded, as per UL60950-1 and UL 60950-22 requirements.

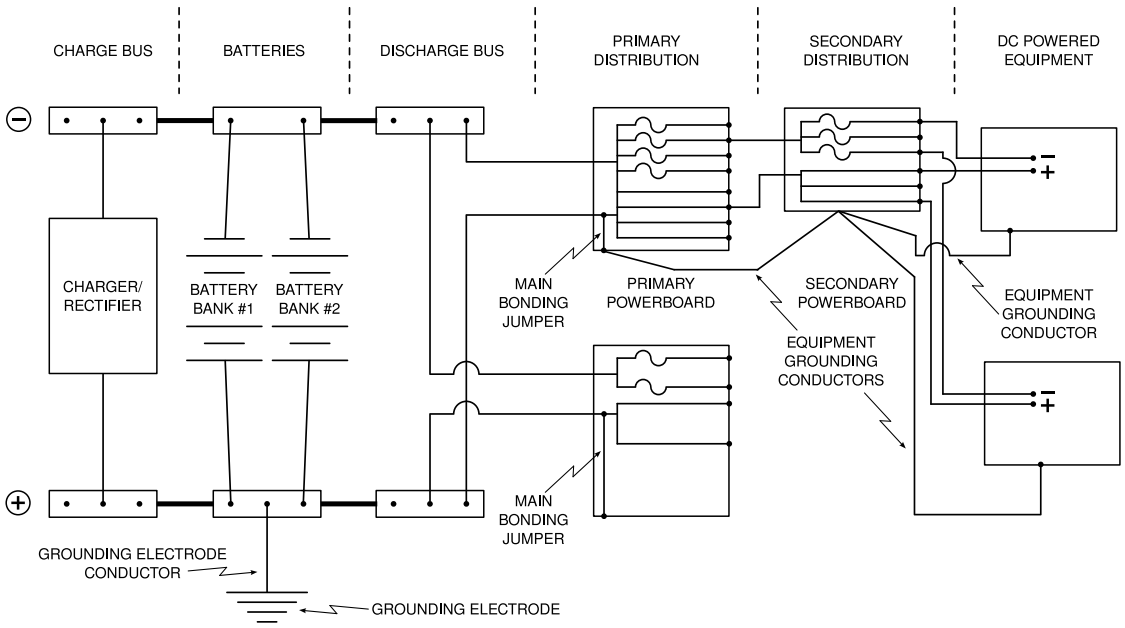

Figure 1: Typical Centralized DC Power System, Plant and Distribution Source-Grounded DC Power System

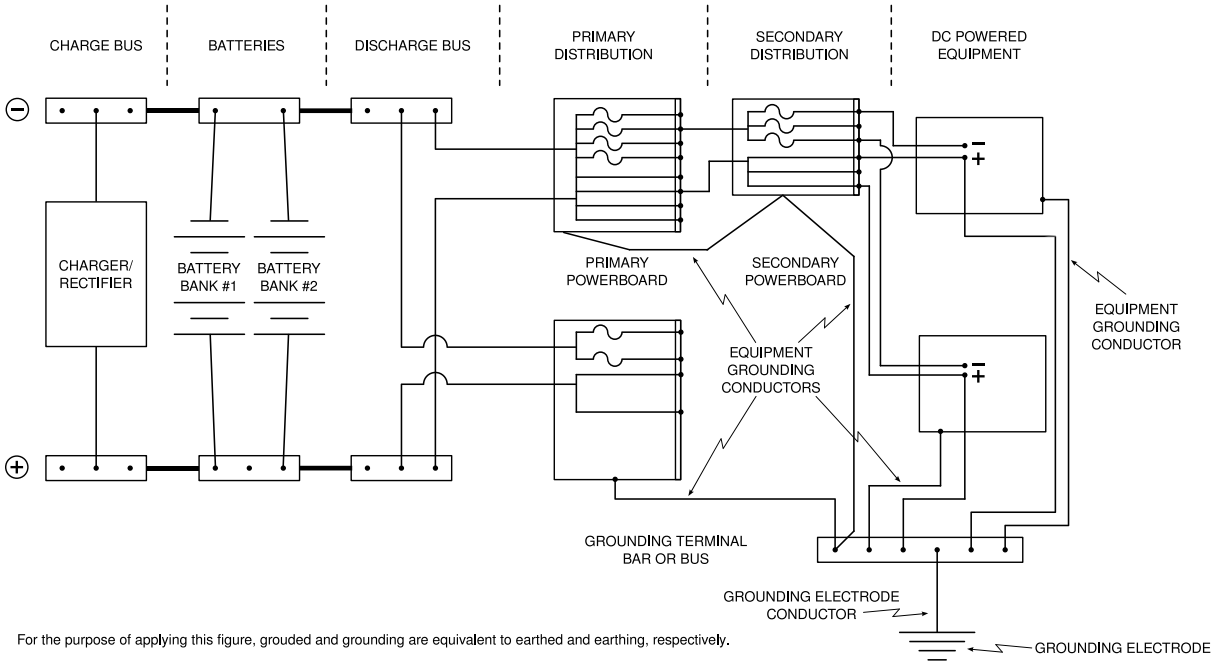

Figure 2: Typical Centralized DC Power System, Plant and Distribution DC Power System Grounded at Equipment Location

Section 1.3.3
Equipment Installation

Install the equipment in accordance with the electrical code relevant to the country of installation, such as the National Electrical Code (NEC), ANSI/NFPA 70; the Canadian Electrical Code (CEC), Part 1, CSA C22.1; and when applicable, the National Electrical Safety Code IEEE C2. Unless marked or otherwise identified, the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75, also applies.

Section 1.3.4
Radio Frequency (RF) Exposure

The WiN7000 is compliant with the requirements set forth in CFR 47, section 1.1307, addressing Radio Frequency (RF) exposure from radio frequency devices as defined in OET Bulletin 65. The emitted radiation should be as little as possible. To achieve minimum RF exposure, install the WiN7000 when it is configured not to transmit and set it to operational mode remotely, rather than enabling transmission by the installer on-site. For maintenance of the WiN7000, or other operations which require RF exposure, the exposure should be minimized in time and according to the regulations set by the FCC or the regulations relevant to the country of installation.

Section 1.3.5
Lightning Protection

WARNING!
When the WiN7000 is installed in an outdoor location, all indoor components (such as Ethernet and power supply) should be connected through a lightning protector.

Lightning protection protects people and equipment located indoors from lightning that might strike the WiN7000 or its outdoor cables. Therefore, install the lightning protector device indoors, as close as possible to the point where the cables enter the building. The lightning protector can also be installed outdoors as long as the cables that lead indoors are well protected from lightning between the protector and the building entrance.

Section 1.3.6
Power Cord Protection

Route all power supply cords so that people cannot walk on them or place objects on or against them. Walking on the cords or placing objects on or against the cords can damage the cords.

Section 1.3.7
Servicing

Do not open the cover of this product to attempt service unless instructed by a RUGGEDCOM certified technician. Refer all repairs to qualified service personnel. Removing the covers or modifying any part of this device voids its warranty.

Siemens does not endorse or support the use of proprietary third-party outdoor cable assemblies not supplied by Siemens.

WARNING!
Keep away from electric power lines.

You can be killed if the antennas are in close proximity to electric power lines. Carefully read and follow all instructions in this manual. By nature of the installation, you may be exposed to hazardous environments and high voltage. Use caution when installing the outdoor system.

Section 1.3.8
Antenna Grounding Requirements

The antenna installation must be as per Article 810 of the NEC. Of particular note is the requirement that the grounding conductor not be less than 10 AWG (Cu). The scheme should be either in accordance with UL 96 and 96A Lightning Protection Components and Installation Requirements for Lightning Protection Systems, or tested in accordance with UL 50 and UL 497.

Section 1.3.9
Outdoor Grounding System

WARNING!
Verify that the base station is grounded.

The system must be properly grounded to protect against power surges and accumulated static electricity. It is the installer's responsibility to install this device in accordance with the local electrical codes.

Section 1.3.10
User ports and power supply

If the length of outdoor exposed communication lines is greater than 40 m (140 feet), these lines must be treated as TNV-1 circuits. The installer must ensure that the power supply and network ports are designed for full compliance with the TNV-1 telecommunication network.

Section 1.3.11
Safety Hazards

WARNING!
Installing the WiN7000 can pose a serious hazard. Be sure to take precautions to avoid the following:

- *Exposure to high voltage lines during installation*
- *Falling when working at heights or with ladders*
- *Injuries from dropping tools*

- *Contact with AC wiring (power system connection)*

WARNING!
To reduce the risk of fire, use only 26AWG or larger telecommunication line cord.

Section 1.4

WiN7000 Physical Specifications

The WiN7000 is packed in a waterproof metal housing. A mounting bracket and mounting kit allows for pole or wall installation. The assembled unit weighs approximately 15kg.

For information on the WiN7000 wiring connections, see Section 3.5.6, “Power and Cable Connections”.

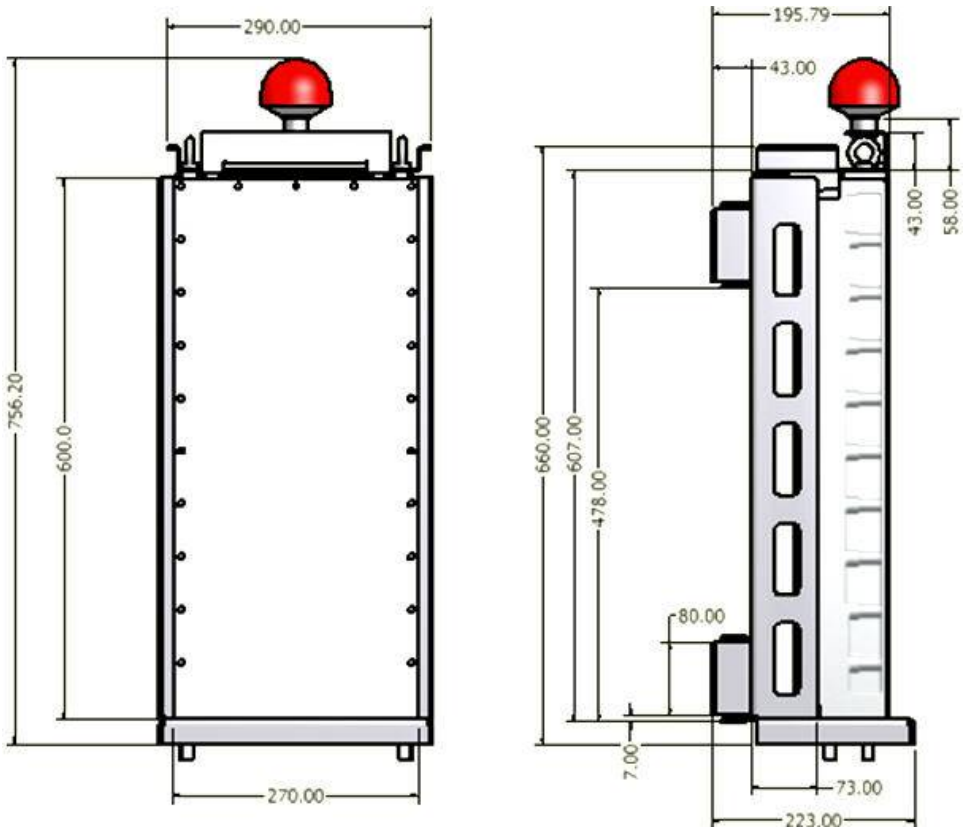

Figure 3: WiN7000 Dimensions

2 Site and Installation Requirements

Section 2.1
Mounting Considerations

When choosing a mounting location, consider the available mounting structures and antenna clearance. To provide better weather protection, the WiN7000 should be mounted with the connection panel facing downwards.

The base station is equipped with a mounting kit, which allows several mounting options:

- Poles: Attach the WiN7000 to any pipe or pole with diameter 1.75" to 10".
- Towers and Walls: Attach the WiN7000 to any tower or wall that can support the load of the unit.

The following antenna options are available:

- 2 × omni-directional antenna
- External sector dual slant ±45º antenna
- Two separate antennas

Before mounting the antennas, conduct a site survey to determine the optimal position for the antennas. Observe the following guidelines:

- Mount the antennas at the highest point possible. Reception will increase according to the height of the antennas.
- Mount the antennas in a place with as few obstacles as possible between the antennas and the planned service area.
- To avoid interference, mount the antennas and base station as far as possible from antennas of other devices and other base stations.
- To keep the cable from the base station to the antenna as short as possible, mount the antennas as close as possible to the base station. Using a cable longer than 2 meters will result in greater loss and more interference, as the cable will act as an antenna.
- Do not point the antennas directly at populated areas, and locate the antennas at least 3.6 m from people and public areas.
- Mount the antennas and base station in a place that allow for maintenance access to the unit.
- Mount the GPS antenna in a position where the whole sky is visible to the antenna. If the base station is mounted on a wall and the GPS antenna is mounted on top of the base station, only half of the sky will be visible to the antenna. This may not be enough for proper operation.

3 Installation Procedures

Section 3.1
Pre-Installation Safety Instructions

WARNING!
Installing the WiN7000 can pose a serious hazard. Be sure to take precautions to avoid the following:

- *Exposure to high voltage lines during installation*
- *Falling when working at heights or with ladders*
- *Injuries from dropping tools*
- *Contact with AC wiring (power system connection)*

Section 3.2
Package Components and Unpacking

Check that the package contains:

- WiN7000.
- GPS antenna
- 2 × RF cables 1.6 m for connection to antenna
- Pole / wall mount kit
- WiNPS 48V power supply for Copper and SFA configuration

Section 3.3
Cat5 Cable Requirements

All Cat5 cables used in the installation of the base station must meet the following requirements:

- Must be provided or approved by Siemens
- Must not be longer than 80 m (262 ft)
- Must be ground as shown in Figure 4

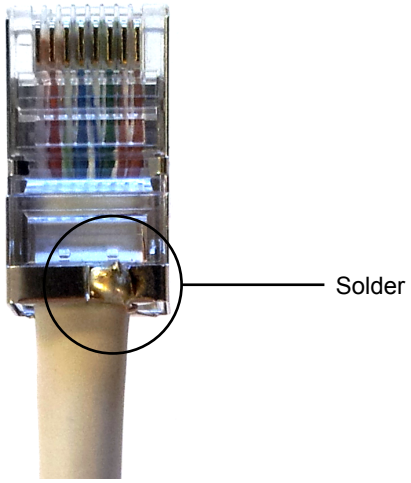

Figure 4: Cat5 Cable Grounded

Section 3.4

Installation Tools

- Phillips screwdriver
- Wrench or socket set
- Drill and 5/16" drill bit
- Self-fusing electrical tape or insulating putty suitable for use in the unit's installation environment

Section 3.5

Installing the Base Station

WARNING!
The equipment should be installed in compliance with the National Electrical Code (NEC), ANSI/NFPA 70, the Canadian Electrical Code (CEC), Part 1, CSA C22.1; and when applicable, the National Electrical Safety Code IEEE C2. Unless marked or otherwise identified, the Standard for the Protection of Electronic Computer/Data Processing Equipment, ANSI/NFPA 75.

The following components are required for the installation:

- Mounting bracket
- WiN7000
- RF antennas
- GPS antenna
- Power supply
- Ground, data, and power cables

To install the WiN7000, follow these general steps:

1. Install the mounting bracket at the chosen location.
2. Install the antennas.
3. Prepare the grounding cables.
4. Lay out the connection cables.
5. Mount the power supply.
6. Mount the base station to the mounting bracket.
7. Connect all cables to the WiN7000 and seal connections with suitable electrical tape or putty.

Section 3.5.1
Sealing Screw

CAUTION!
Do not attempt to open the sealing screw on the bottom side of base-station. Opening the screw will break the sealing and will cause the moisture getting into the base-station.

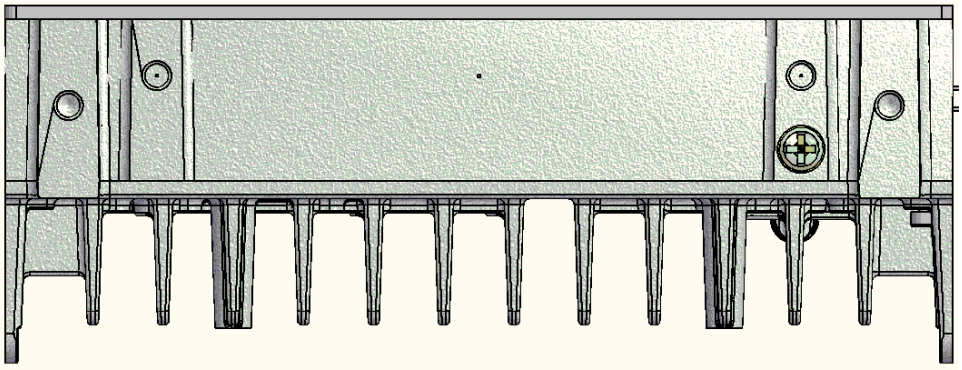

Figure 5: Location of the Sealing Screw

Section 3.5.2
WiN7000 Mounting Bracket

The mounting bracket is used for both pole- and wall-mount installations.

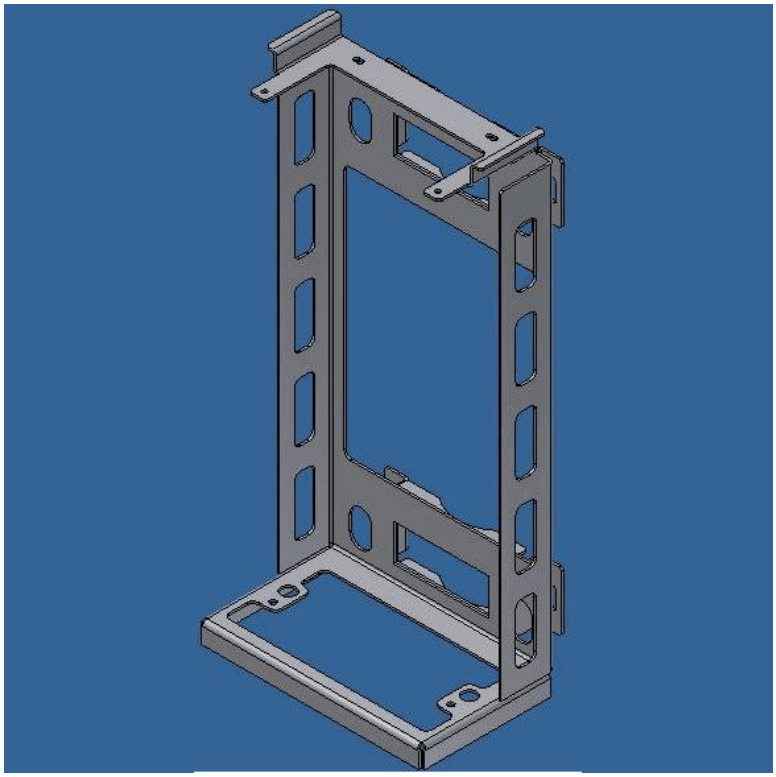

Figure 6: Mounting Bracket

Section 3.5.3
Pole Mounting

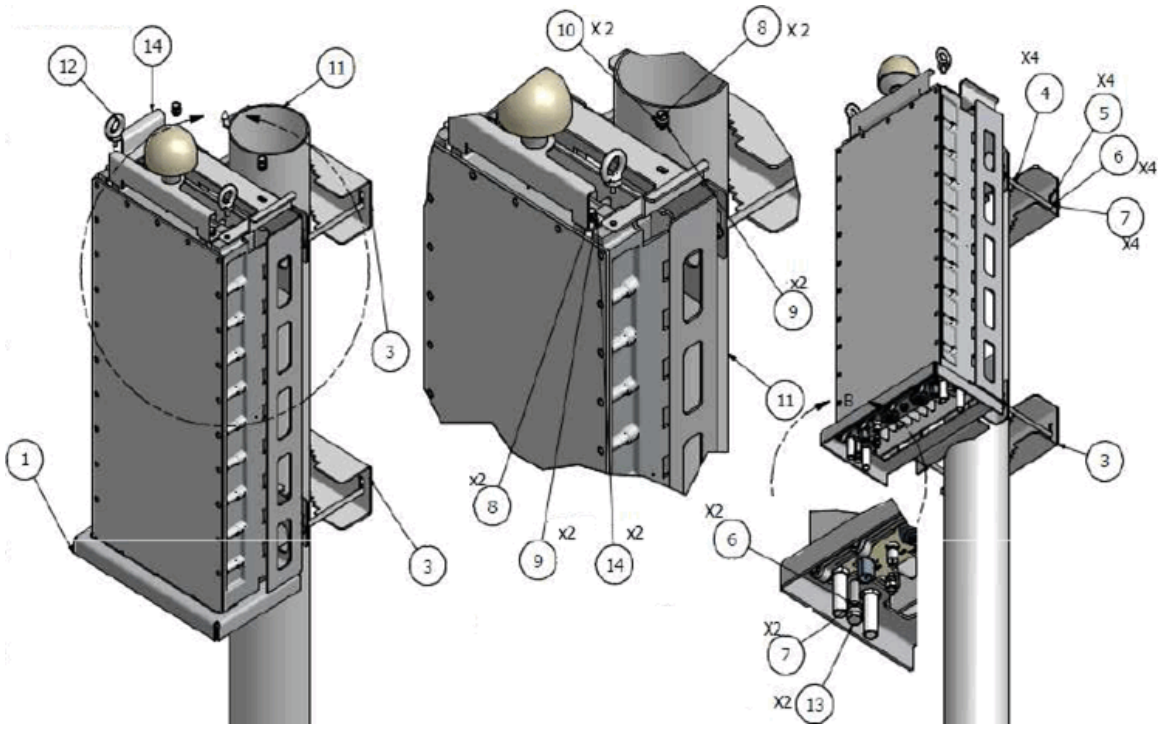

Figure 7: WiN7000 Pole Mounting Diagram

Table: WiN7000 Pole Mount Parts List

Item	Quantity	Description
1	1	Mounting brackets
2	1	WiN7000
3	2	Fastening brackets
4	4	Screw 5/16" hex cap × 6"
5	8	Nut NF 16 hex
6	10	Washer flat 5/16"
7	10	Washer spring 5/16"
8	4	Screw NC 1/4" × 1/2" hex
9	4	Washer flat NC 1/4"
10	4	Washer spring NC 1/4
11	1	Pole
12	2	Bolt NC 1/4"
13	2	Screw NC 5/16" × 1/2"
14	1	Mounting Upper Bracket

Procedure: Installing the WiN7000 on a Pole

1. Select a mounting location on the pole.
2. Assemble the fastening brackets to the mounting bracket using the 5/16" × 6" hex cap screws (Item 4), NF 16 hex nuts (Item 5), 5/16" flat washers (Item 6), and 5/16" spring washers (Item 7).
3. Lift the base station by the eye bolts and secure it to the mounting bracket. At the top of the unit and mounting bracket, use NC 1/4" × 1/2" hex screws (Item 8) and NC 1/4" flat washers (Item 9). At the bottom of the unit and mounting bracket, use 5/16" flat washers (Item 6), 5/16" spring washers (Item 7), and NC 5/16" × 1/2" screws (Item 13).
4. Complete the wiring connections.

NOTE
Seal all connectors with self-fusing electrical tape or insulating putty suitable for use in the unit's installation environment

Section 3.5.4
Wall Mounting

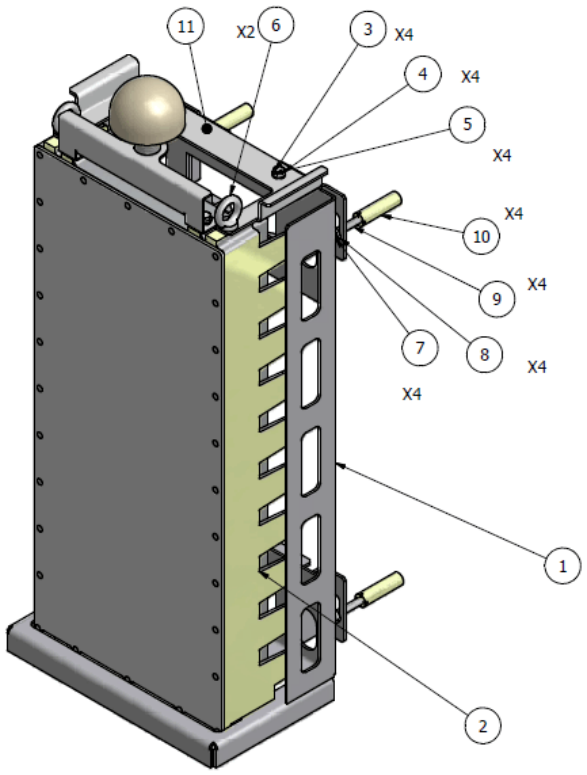

Figure 8: WiN7000 Wall Mounting Diagram

Table: WiN7000 Wall Mount Parts List

Item	Quantity	Description
1	1	Mounting brackets

Item	Quantity	Description
2	1	WiN7000
3	4	Screw NC 1/4" × 1/2" hex
4	4	Washer flat NC 1/4"
5	4	Washer spring NC 1/4"
6	2	Bolt NC 1/4"
7	4	Screw 5/16" hex cap × 2"
8	4	Washer flat 5/16"
9	4	Washer spring 5/16"
10	4	Dowel 5/16"
11	1	Mounting upper bracket

Procedure: Installing the WiN7000 on a Wall

1. Select a mounting location.
2. Place the mounting bracket on the wall and mark the location of the four mounting holes, two at the top and two at the bottom.
3. With a 5/16" drill bit suitable for the wall material, drill holes at the marked locations.
4. Insert the 5/16" dowels (Item 10) into the holes.
5. Assemble four 5/16" flat washers (Item 8), four 5/16" spring washers (Item 9), and four 5/16" × 2" hex cap screws (Item 7) into the holes on the mounting bracket.
6. Secure the mounting bracket to the wall.
7. Lift the base station by the eye bolts and secure it to the mounting bracket. At the top of the unit and mounting bracket, use NC 1/4" × 1/2" hex screws (Item 3), NC 14" flat washers (Item 4), and NC 1/4" spring washers (Item 5).
8. Complete the wiring connections.

NOTE
Seal all connectors with self-fusing electrical tape or insulating putty suitable for use in the unit's installation environment. For more information on sealing the connectors, see Section 3.6, "Weatherproofing".

Section 3.5.5
Tower Mount

Follow the same procedure as for wall mounting; see Section 3.5.4, "Wall Mounting". Ensure that the tower can hold the load of the base station.

Section 3.5.6

Power and Cable Connections

There are three power connection options for the WiN7000, which are described in the following sections. The power connection options are as follows:

- PEC (Copper) Type Base Station
- SFA (Optical) Type Base Station
- SFD Type Base Station

The WiN7000 can be equipped with copper or fiber Ethernet connections. These copper and fiber port options are described in Section 3.5.6.1, “PEC (Copper) Type Base Station” and Section 3.5.6.2, “SFA (Optical) Type Base Station”.

Section 3.5.6.1

PEC (Copper) Type Base Station

The power system is supplied by Siemens (WiNPS).

To connect the power system and cables, do the following:

Procedure: Connecting the Power System and Cables

1. Connect the supplied combo (DC + Ethernet cable) to the power system (WiNPS) port labeled DC + ETH.
2. Connect the other end to port 6 on the WiN7000 unit as shown in Figure 10.
3. Connect the Ethernet input to the *10/100 Base-T* connector on the power system.

The following figure shows the physical connection between the WiN7000, the power system, and the AC power source.

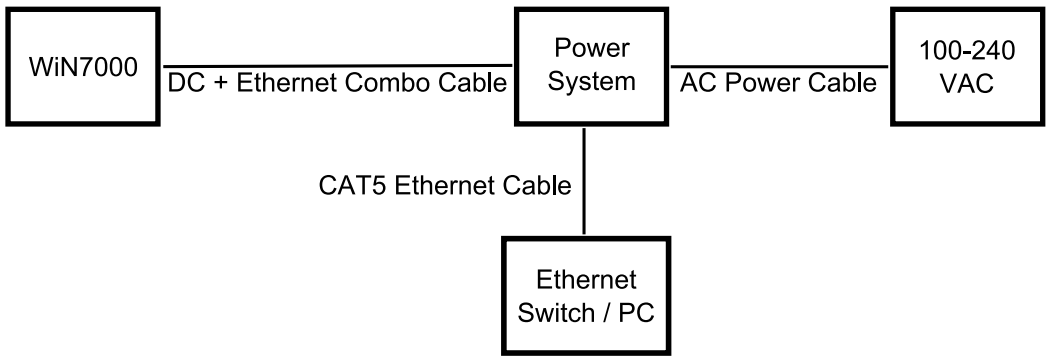

Figure 9: Base Station Power Connection

The following figure and table show the ports, connectors and cables.

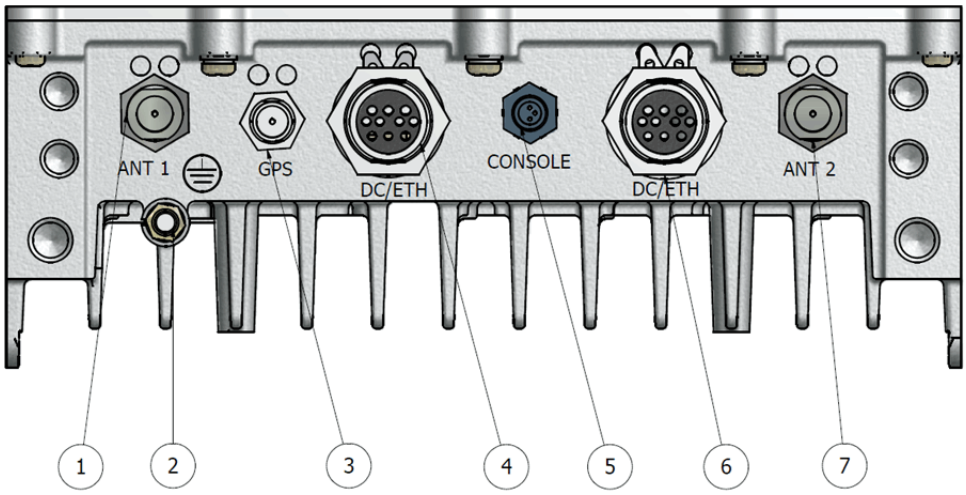

Figure 10: Copper Ethernet Port Option

Table: WiN7000 Connectors and Cables

Port Number	Connector Name	Connector Type	Cable Type	Function	Connected to
1	ANT1	N type Female	RG 6 or 9	Connected to external antenna or omni-directional antenna	Antenna
2	GND	Adjustable nut	#10 AWG bare copper wire	Grounding	Central earth ground, tower or pole chassis
3	GPS	TNC Female	Proprietary cable	GPS signal	GPS antenna
4	Not used				
5	Console	3-pin	UART 3P to DB9F"	Low level CLI for technicians	PC
6	DC/ETH	DC + ETH	Proprietary cable	48 VDC/ Return / 5A + Ethernet Cat5	Power supply + Network/ Router/Switch
7	ANT2	N type Female	RG 6 or 9	Connected to external antenna or omni-directional antenna	Antenna

Section 3.5.6.2

SFA (Optical) Type Base Station

The power system is supplied by Siemens (WiNPS).

To connect the power system and cables, do the following:

Procedure: Connecting the Power System and Cables

1. Connect the supplied DC cable to the power system (WINPS) port labeled DC+ETH.
2. Connect the other end of the cable to the DC/ETH port on the WiN7000 shown as port 4 in Figure 12.
3. Connect the optical cable to the F/O connector on the WiN7000 (for more information, see Figure 12).

4. Connect the optical cable to the network switch.

NOTE
The fiber optic standard is Gigabit Ethernet 1000 Base-LX.

The following figure shows the physical connection between the WiN7000, the power system, and the AC power source.

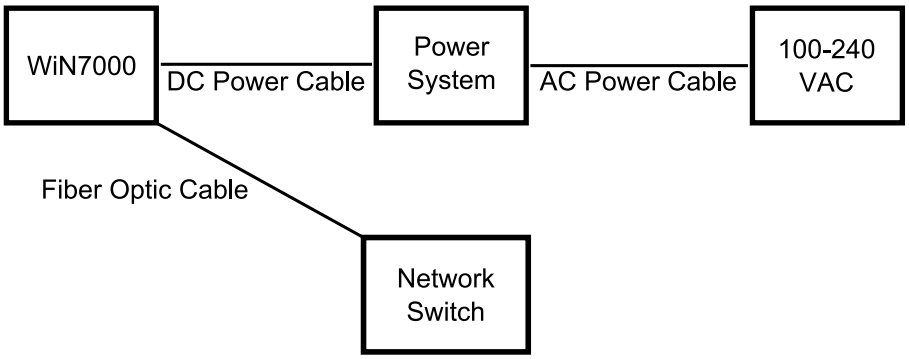

Figure 11: Base Station Power Connection

The following figure and table show the ports, connectors and cables.

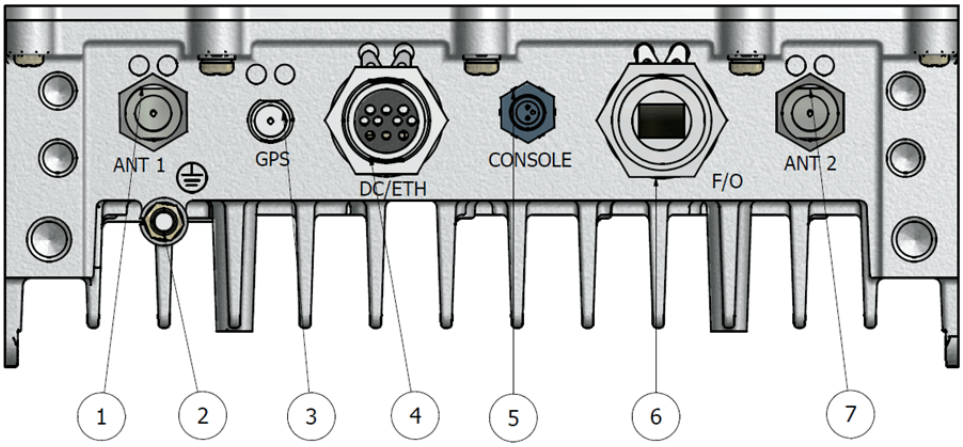

Figure 12: Fiber Optic Ethernet Port Option

Table: WiN7000 Connectors and Cables

Port Number	Connector Name	Connector Type	Cable Type	Function	Connected to
1	ANT1	N type Female	RG 6 or 9	Connected to external antenna or omni-directional antenna	Antenna
2	GND	Adjustable nut	#10 AWG bare copper wire	Grounding	Central earth ground, tower or pole chassis

Port Number	Connector Name	Connector Type	Cable Type	Function	Connected to
3	GPS	TNC Female	Proprietary cable	GPS signal	GPS antenna
4	DC/ETH or DC	DC/ETH or DC	Proprietary cable	48 VDC / Return / 5A + Ethernet Cat5 Or 48 VDC / Return / 5A	Power supply + Network/Router/Switch Or Power supply
5	Console	3-pin	UART 3P to DB9F"	Low level CLI for technicians	PC
6	F/O	Optic SM Mini LC	Fiber Optic SM OFNR I/O with Industrial Plug, ODVA Cable	Optic 100M/1GMbit	Network/Router/Switch
7	ANT2	N type Female	RG 6 or 9	Connected to external antenna or omni-directional antenna	Antenna

Section 3.5.6.3

SFD Type Base Station

The power system is supplied by the operator.

To connect the power system and cables, do the following:

Procedure: Connecting the Power System and Cables

1. Connect the power system DC output to the supplied connector.
2. Connect the other end (open end) of the supplied cable to the operator's power system (according to the labelling on the cable and the following tables). For more information, see Figure 13 and Figure 14, which show +48V and -48V configurations.

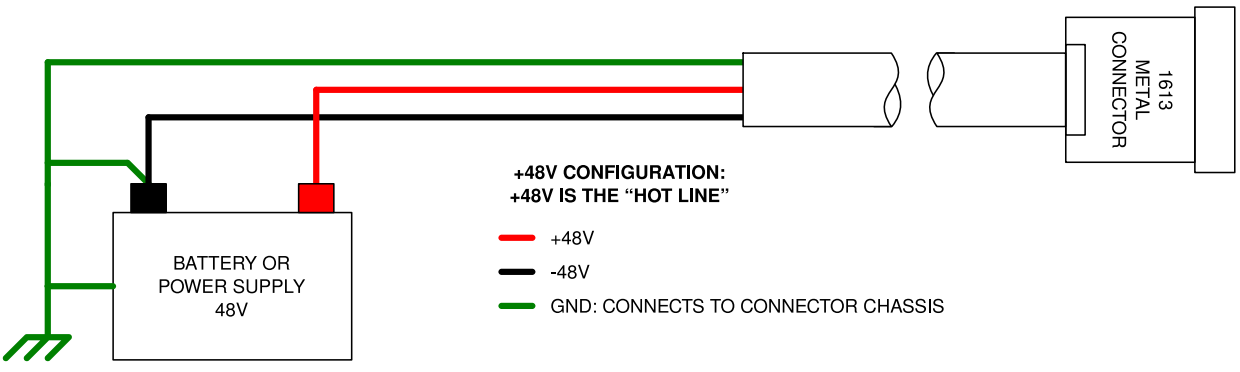

Figure 13: Positive 48V Configuration

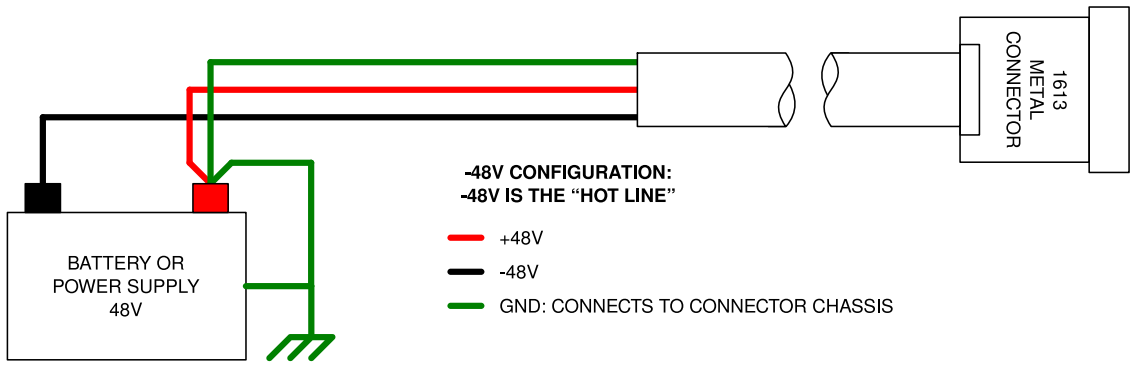

Figure 14: Negative 48V Configuration

3. Connect the optical cable to the F/O connector on the WiN7000 (for more information, see Figure 15).

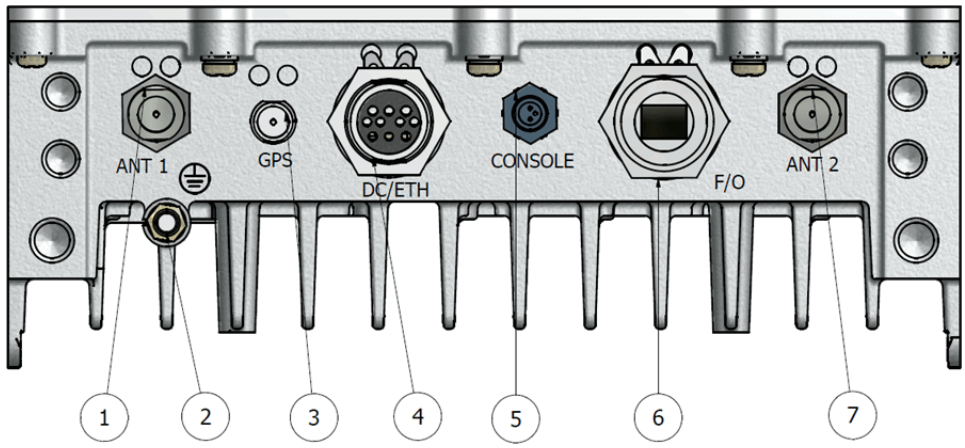

Figure 15: Fiber Optic Ethernet Port Option

4. Connect the optical cable to the network switch (for more information, see Figure 16).

NOTE
The fiber optic standard is Gigabit Ethernet 1000 Base-LX.

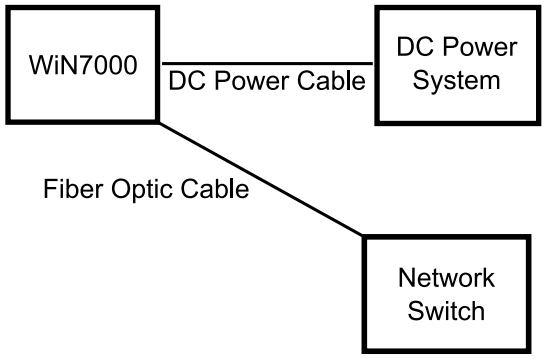

Figure 16: Base Station Power Connection

Table: +48 VDC Power System

Supplied Cable	Power Supply	Note
-48VDC	-48VDC	GND
+48VDC	+48VDC/ GND	“HOT Line”
GND	-48VDC/ GND	Connect -48V and GND

Table: -48 VDC Power System

Supplied Cable	Power Supply	Note
-48VDC	-48VDC	“HOT Line”
+48VDC	+48VDC/ GND	GND
GND	+48VDC/ GND	Connect +48V and GND

Section 3.5.7

Grounding the Device

Ground the device as shown in Figure 17.

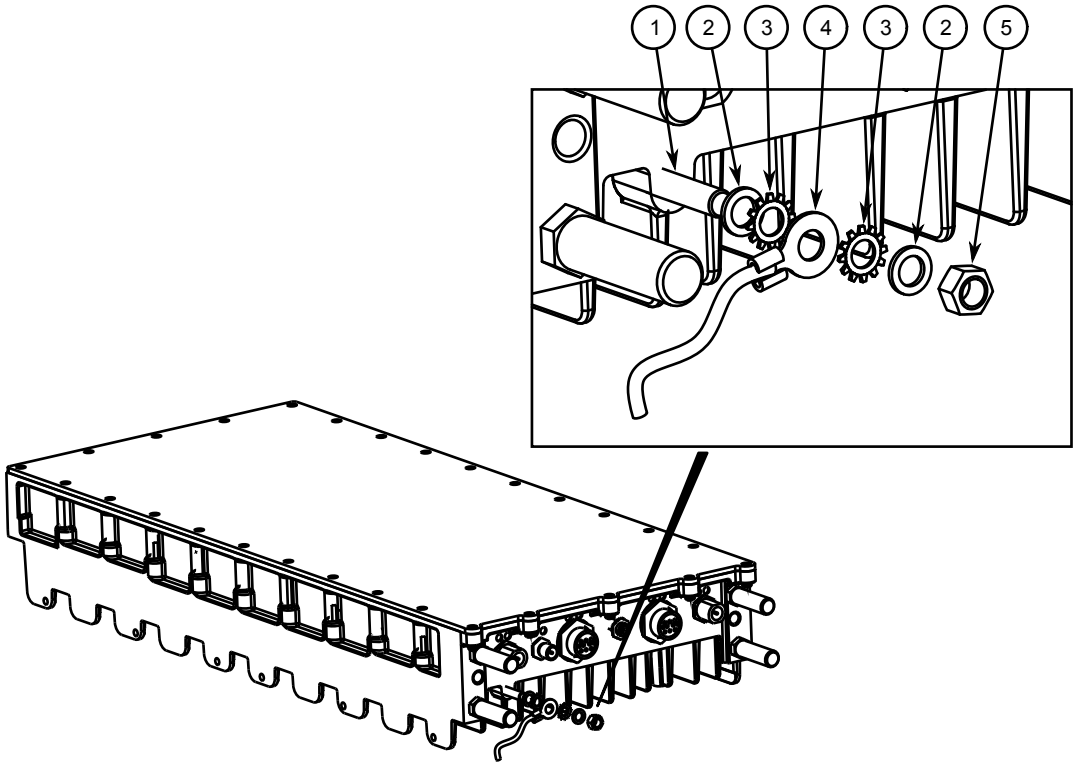

Figure 17: Ground Cable Assembly

1. Ground Stud **2.** Flatwasher **3.** External Tooth Lockwasher **4.** Grounding Cable **5.** Nut

Section 3.5.8

Installing the GPS Antenna

To install the GPS antenna, do the following:

Procedure: Installing the GPS Antenna

1. Mount the GPS antenna as shown in Figure 18.

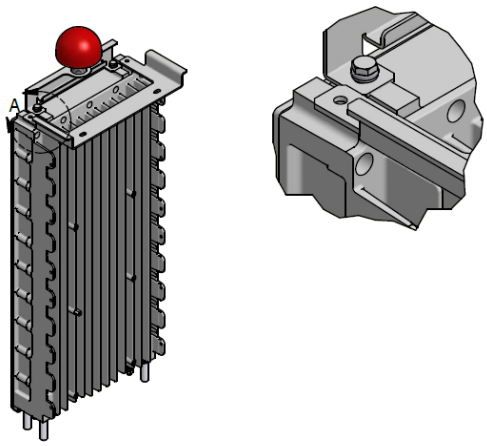

Figure 18: Installing the GPS Antenna

2. Connect the GPS cable (TNC female connector) between the antenna and the base station.

Section 3.5.9

2.3GHz Band Cavity Filters Installation

To comply with FCC limits, the unit must be connected to cavity filters (for full-power configuration only). Follow these steps to assemble the 2.3GHz cavity filters and connect them to the base station antennas. There are two types of cavity filters: one for A+B band, and one for C+D band.

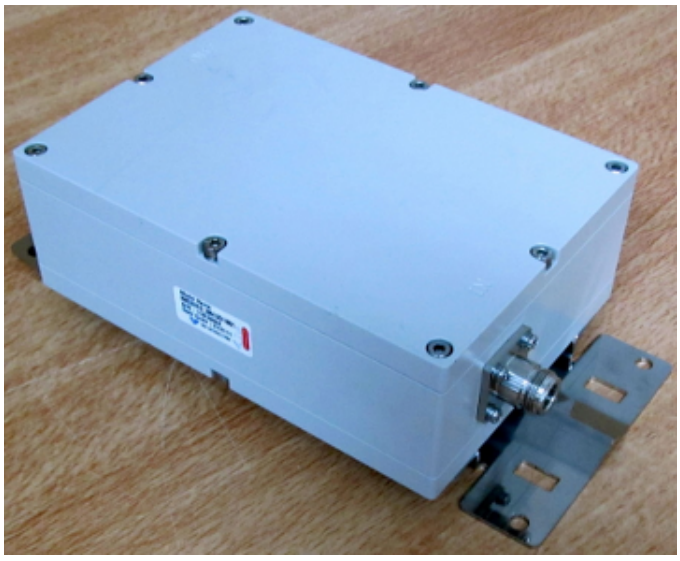

Figure 19: A+B Band Cavity Filter

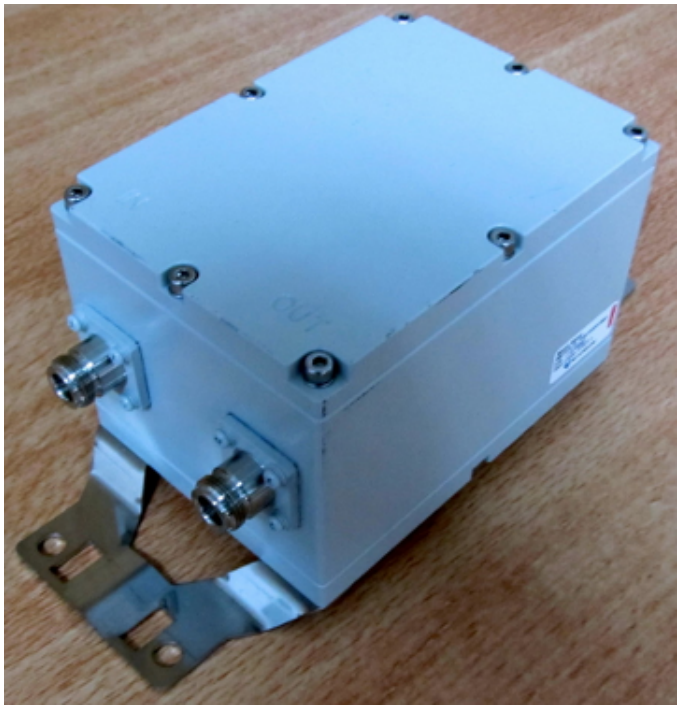

Figure 20: C+D Band Cavity Filter

The cavity filter mounting kit provides the following mounting options:

- Pole mounting: Attach the filters to any pipe or pole with a diameter of 1.75" to 10".
- Wall mounting: Attach the filters to any wall that can support the weight of the filters and mounting bracket.

Procedure: Assembling and Connecting Cavity Filters

1. Position the cavity filters (Item 1 × 2) on the baseplate (Item 2).
2. Secure the filters to the baseplate using Flat Washer (M5), Spring Washer (M5), and Screw (M5) (Items 3, 4, and 5 × 8).

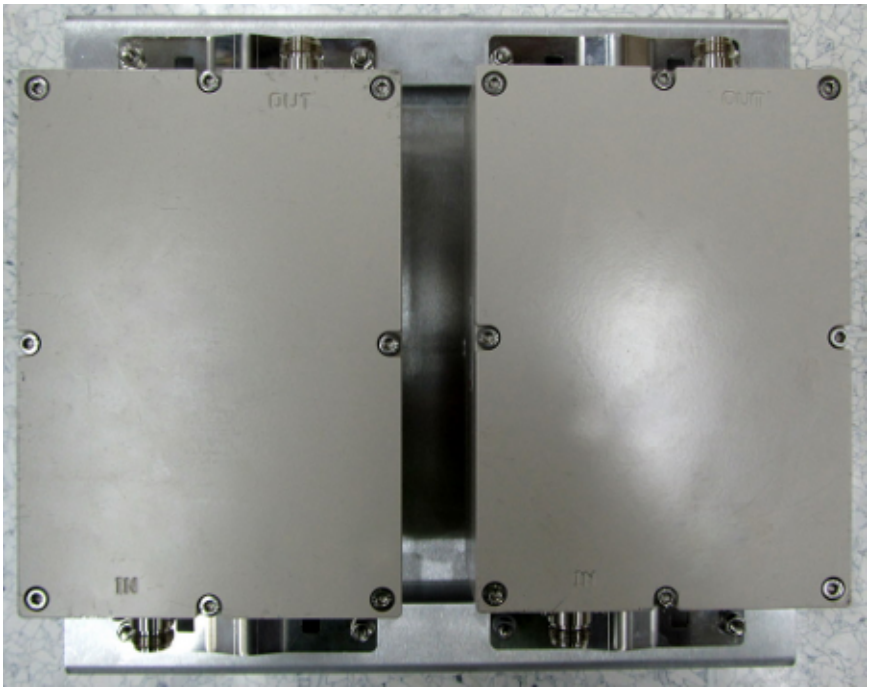

Figure 21: A+B Band Cavity Filters Mounted on Baseplate

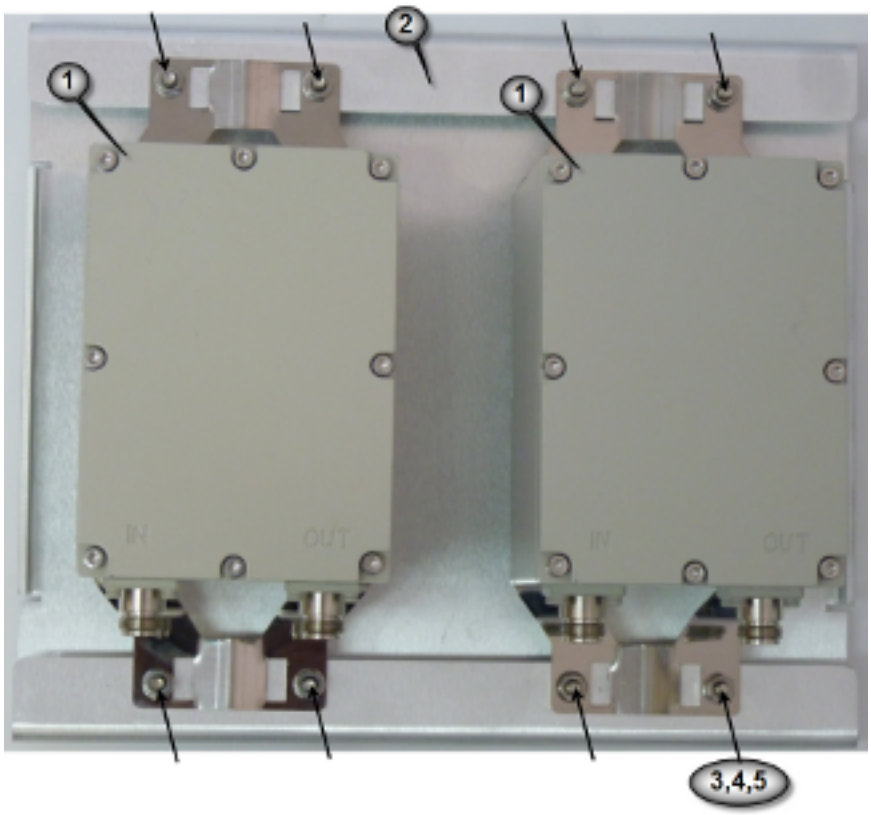

Figure 22: C+D Band Cavity Filters Mounted on Baseplate

3. Position the adaptor plate (MT-120018) on the baseplate in the position shown in Figure 23.
4. Secure the adaptor plate using Flat Washer (M5), Spring Washer (M5), and Hex Nut (M5) (Items 2, 3, and 4 × 4).

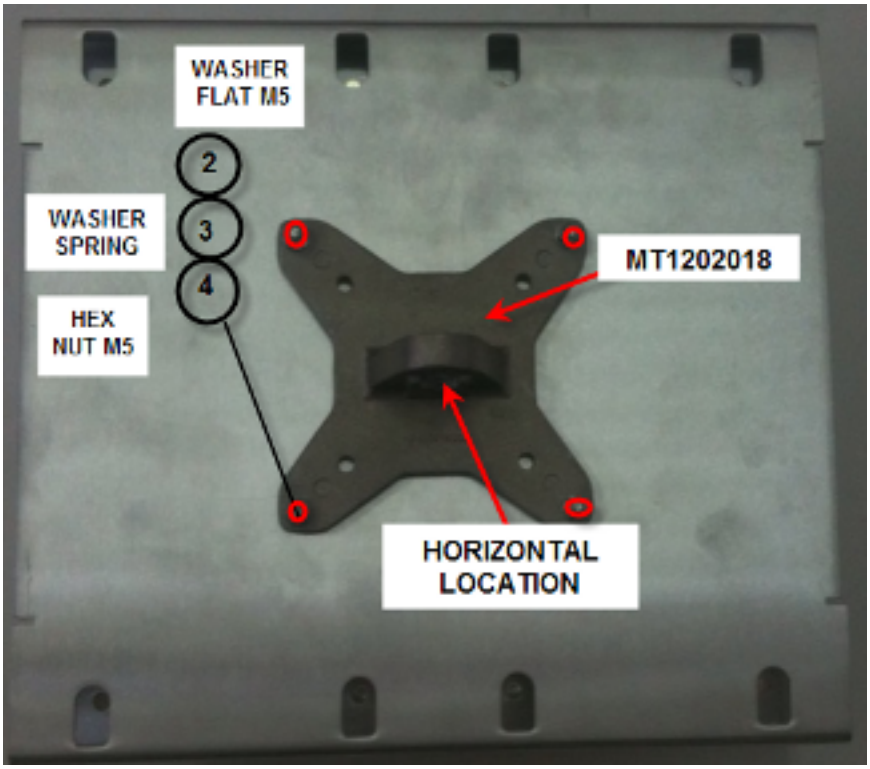

Figure 23: Adaptor Plate Mounted on Baseplate

5. Insert the adaptor bracket into the adaptor plate.
6. Secure the adaptor bracket with Set Screw (M5) as shown in Figure 24.

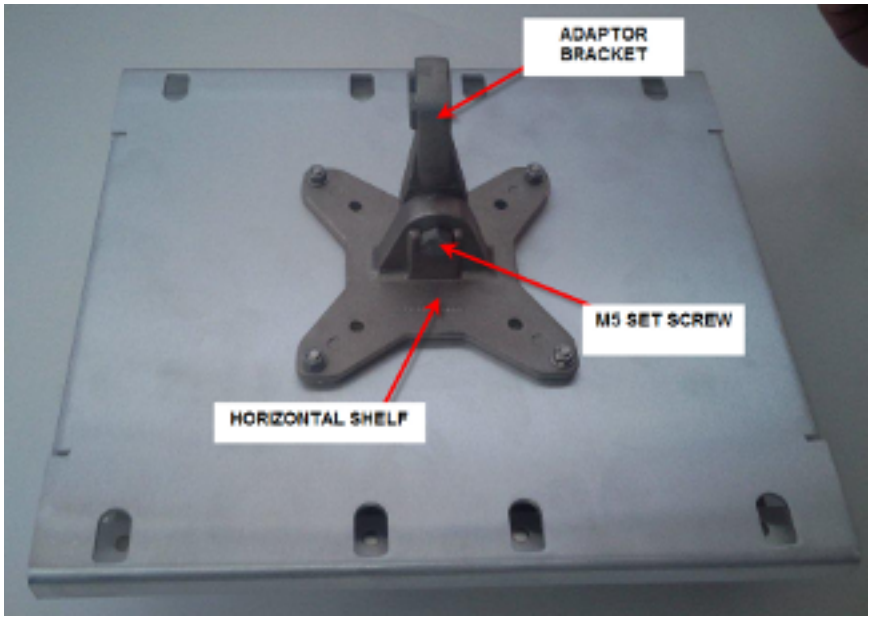

Figure 24: Adaptor Bracket Mounted to Adaptor Plate

7. Attach the wall mount bracket to the adaptor bracket.
8. Secure the wall mount bracket with Flat Washer (M5), Spring Washer (M5), and Set Screw (M5) as shown in Figure 25.

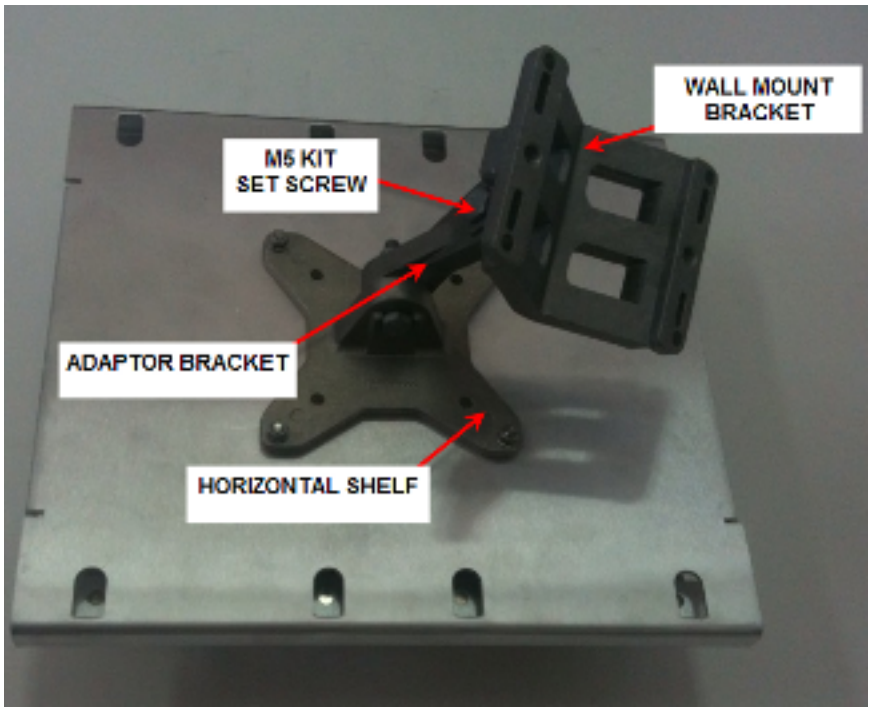

Figure 25: Wall Mount Bracket Assembly

NOTE
For the wall mounting option, assembly of the cavity filter mounting bracket is now complete. Mount the assembly to the wall and complete the antenna connections described in Step 11.

9. For pole mounting, attach the pole mounting bracket to the wall mounting bracket as shown in Figure 26.
10. Secure the pole mounting bracket with Flat Washer (M5), Spring Washer (M5), and Set Screw (M5) as shown in Figure 26.

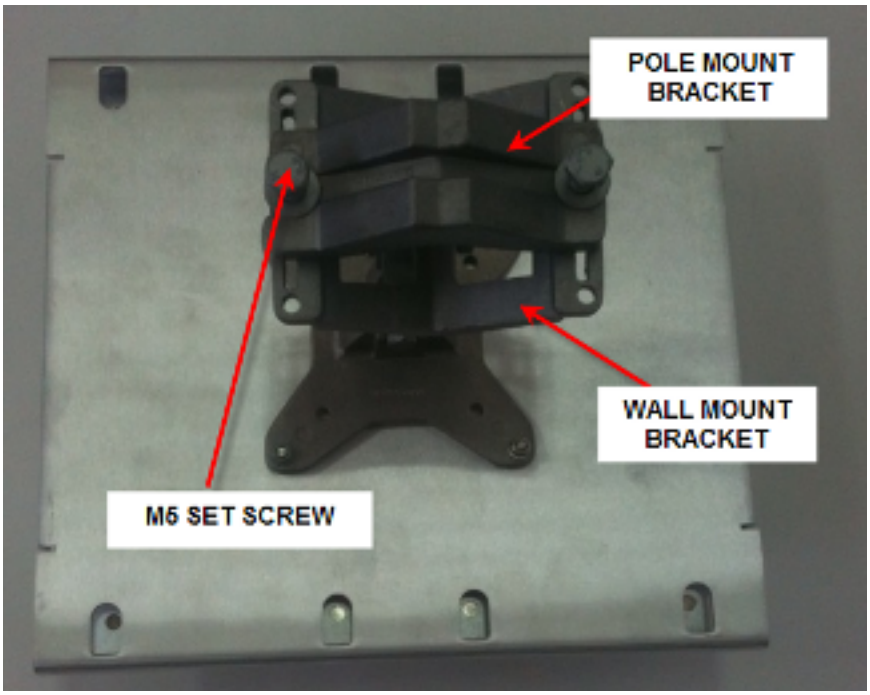

Figure 26: Pole Mount Bracket Assembly

11. Connect the RF cables to the cavity filters and the base station. Connect cavity filter IN to the base station. Connect cavity filter OUT to the antenna.

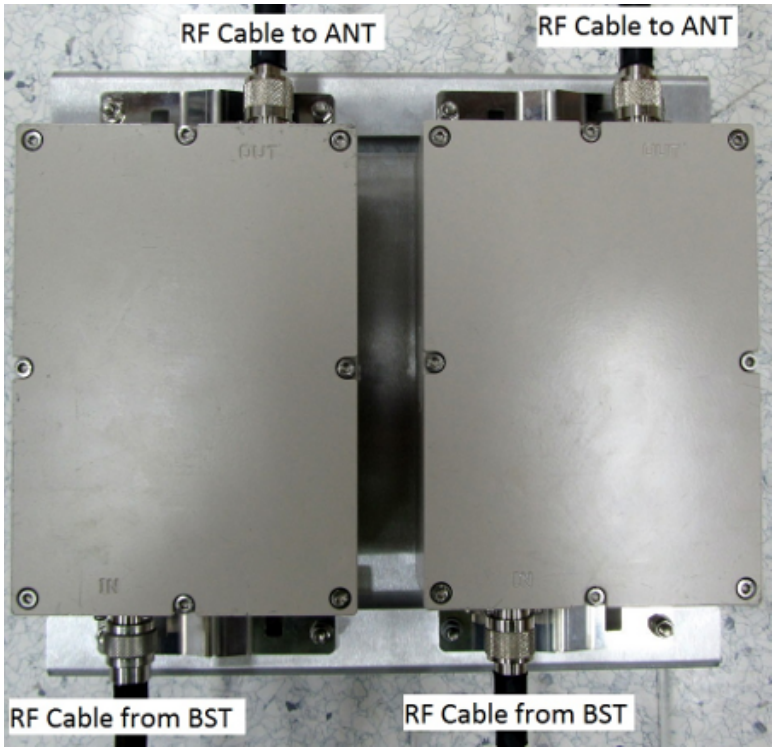

Figure 27: A+B Band Cavity Filter Antenna Connections

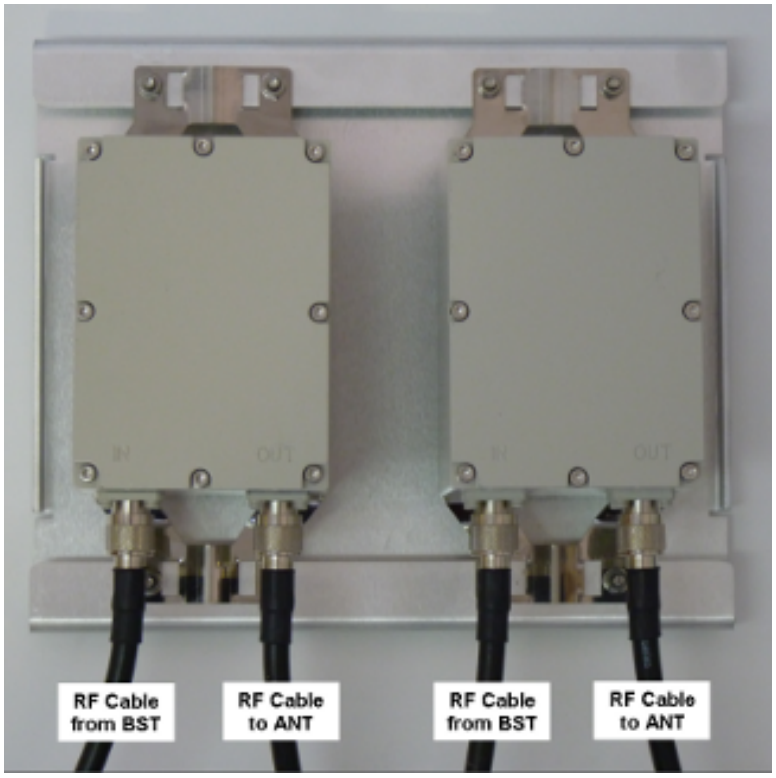

Figure 28: C+D Band Cavity Filter Antenna Connections

Section 3.6

Weatherproofing

It is extremely important to weatherproof all outdoor cable connections. Weatherproofing the connections at the outdoor unit and antennas prevents corrosion, prevents water from interfering with the connection, and helps to keep the connection tight. Because cables also carry DC current, the need for proper weatherproofing cannot be overstated.

We recommend the use of sealing tapes designed for outdoor use:

- 3M™ Scotch® Super 88 Electrical Tape
- Heavy-duty weather-, abrasion-, and UV-resistant rubber splicing tape or self-amalgamating tape

Rubber mastic putty or duct sealing putty must also be used to complete the weatherproofing where needed. We do not recommend silicon seal or glue. These materials are difficult to apply accurately and are difficult to remove. Do not use PVC tape.

Section 3.6.1

Weatherproofing Cable Connections

Most outdoor unit, antenna, or cable problems are caused by coaxial cable connections loosened by vibration, allowing moisture to penetrate the connector interface. We recommend that all outdoor unit-to-cable connections be weatherproofed using a procedure similar to the one described below.

This method of weatherproofing must be completed on *all* external connections. If surge arrestors are used, all the associated connections and arrestors must be completely wrapped with splicing tape or self-amalgamating tape.

NOTE
Before waterproofing, ensure all connectors are correctly tightened. Ensure the connector and cables are free of foreign substances such as oil, water, grease, and dirt. Ensure that the cable extends below the connector to which it is attached, providing a path for water to follow away from the connected device.

Procedure: Weatherproofing Cable Connectors

1. Begin to wrap the rubber-splicing or self-amalgamating tape. Start as close to the equipment body as possible. Stretch and wind the tape around the connector housing, ensuring there are no gaps in the tape.

Figure 29: Wrapping the Connector with Rubber-splicing or Self-amalgamating Tape

2. Tightly wrap the connector and the cable. Overlap the tape, without gaps, all the way along the connector. Continue wrapping the tape 25 mm (1") onto the cable.

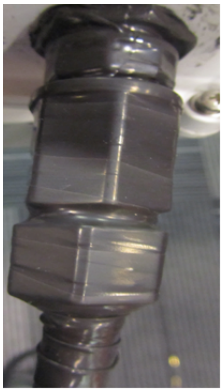

Figure 30: Wrapping the Cable with Rubber-splicing or Self-amalgamating Tape

3. For UV protection of the rubber splicing tape, wrap two layers of electrical tape on top of the rubber splicing tape.

Figure 31: Wrapping the Connector with Electrical Tape

4. Work mastic putty or duct sealing putty between the connector and the body of the radio or antenna. Ensure the putty fills any gaps not covered by the tape.

Figure 32: Sealing Gaps with Putty

5. Apply two layers of electrical tape over the rubber splicing tape for UV protection.

Figure 33 and Figure 34 show the base station connectors wrapped with splicing and electrical tape, before the application of mastic or duct sealing putty.

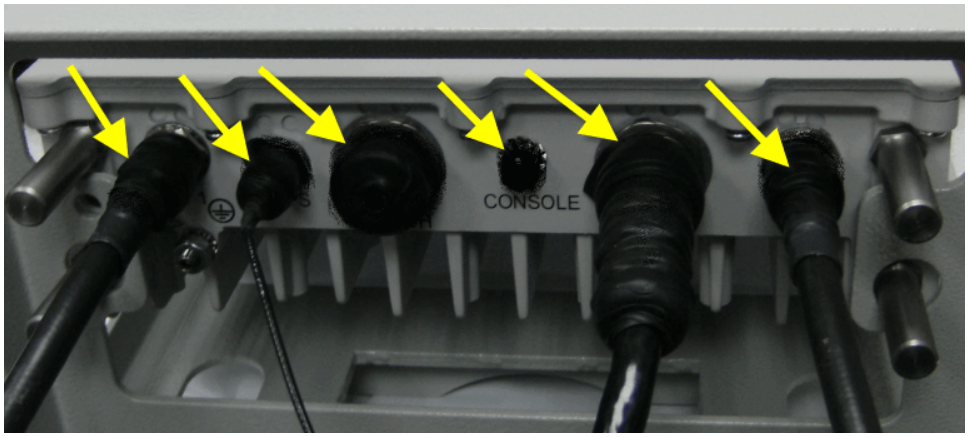

Figure 33: Wrapped Connectors before the application of Weathproofing Putty

Figure 34: Detail of Wrapped Connectors

WARNING!
Assembly without waterproof sealing tape or removing the waterproof sealing tape from this device voids its warranty.

4 Setup

The initial setup procedure consists of:

- Configuring the computer's network parameters and connecting to the WiN7000 Web interface
- Verifying IP connectivity

Section 4.1

Connecting to the WiN7000 Web Interface

This section describes how to configure the network parameters in Microsoft Windows so you can connect a computer to the WiN7000. For instructions on how to configure the network parameters for other operating systems, refer to your operating system documentation.

Before beginning, ensure that the base station is connected to the Power over Ethernet (PoE) power adaptor and that power is applied.

Follow these steps connect a computer to the WiN7000 Web interface:

Procedure: Connecting a computer to the base station

1. Ensure that the PoE adaptor is connected to the base station. Connect the computer's Ethernet port to the PoE adaptor's Ethernet port.
2. On the computer, click **Start** and select **Control Panel**.
3. In the **Control Panel**, select **Network and Internet Connections**.
4. Select **Network Connections** and then double-click **Local Area Connection**. The **Local Area Connections Properties** dialog appears with the **General** tab selected.

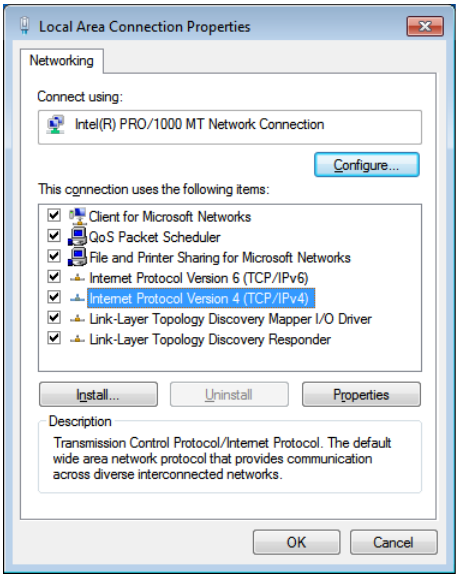

Figure 35: Microsoft Windows Local Area Connection Properties dialog box

5. In the **Items** list, select **Internet Protocol (TCP/IP)** and click the **Properties** button. The **Internet Protocol (TCP/IP) Properties** dialog appears.
6. Assign your computer the IP address 192.168.100.99 and the subnet 255.255.255.0.

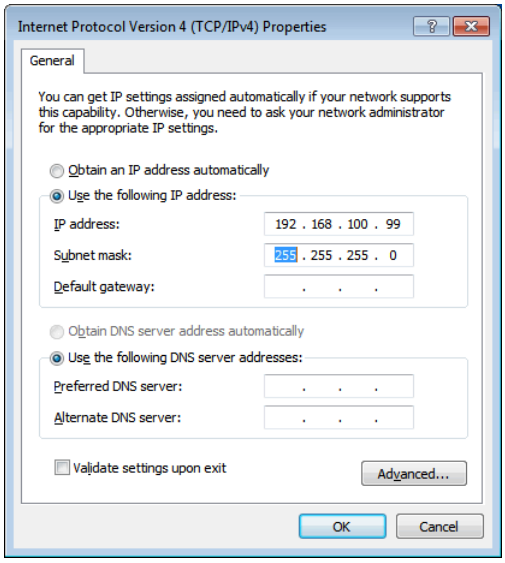
Internet Protocol Version 4 (TCP/IPv4) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 100 . 99
Subnet mask: 255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Validate settings upon exit
Advanced...
OK
Cancel

Figure 36: Microsoft Windows Internet Protocol (TCP/IP) Properties dialog box

7. On the **Internet Protocol (TCP/IP) Properties** dialog, click **OK**. On the **Local Area Connection Properties** dialog, click **Close**.
8. Launch your web browser and type `https://192.168.100.100` in the address field.

NOTE
For information on browser versions and compatibility, refer to the release notes for your software version.

9. The **Login** window appears. Enter your user name and password and click **Log In**. The WiN7000 web interface appears.

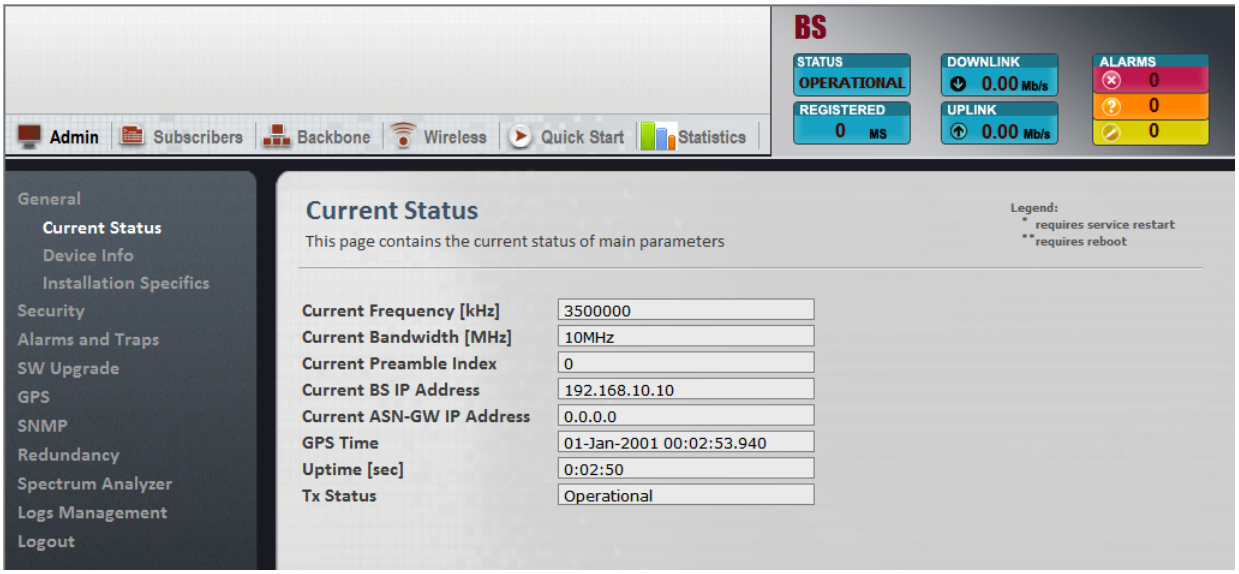

Figure 37: WiN7000 Web Interface: General Status page

5 Troubleshooting

Section 5.1
No IP connectivity

If there is no IP connectivity between the WiN7000 unit and the NMS, perform the following steps:

1. Connect the the computer and the WiN7000 Console connector (serial connection), located on the unit's bottom panel.
2. In the terminal, type **`showIPAddr`** and press **Enter**. The base station's IP address will be displayed.
3. Ping the WiN7000 unit address.
4. If connectivity is still not established, contact Siemens customer support.

Section 5.2
No Serial Connection

If there is no serial connection when using the serial cable, perform the following:

1. Verify IP connectivity using a ping to the WiN7000 unit IP address.
2. If there is no IP connectivity, verify the power connections.
3. If the power connections are okay and there is still no serial connection or IP connectivity, contact Siemens customer support.

A Connector and Cable Pinouts

Power and Ethernet Cable Pinouts

The pinout of the power cable is shown below:

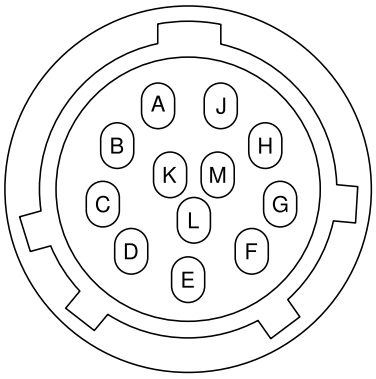

Figure 38: WiN7000 Power Cable Pinout

Table: WiN7000 Power Cable Pinout

Pin Number	Type
A	NC
B	NC
C	+TX Ethernet
D	- TX Ethernet
E	+RX Ethernet
F	- RX Ethernet
G	NC
H	NC
J	NC
K	48VDC (RTN)
L	48VDC (+)
M	Ethernet GND

Console Cable Pinouts

NOTE
In normal operation, the console connector should remain closed and should only be used by an authorized technician.

The console connection is a 3-pin female connector, based on the RS-232 serial standard. The port provides a standard terminal connection through which a technician can configure and monitor the base station through its command line interface (CLI).

- Cable type: 3 wire 28AWG
- Cable connectors: proprietary 3 pin console connector; DBF9
- Cable length: 2m
- The cable is supplied by Siemens.

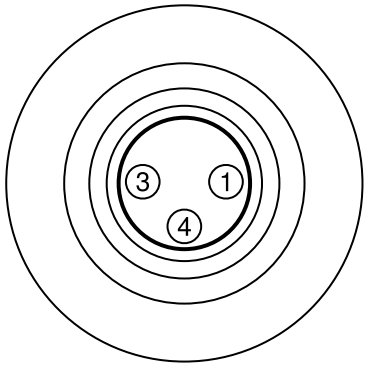

Figure 39: 3-pin Console Connector Pinout

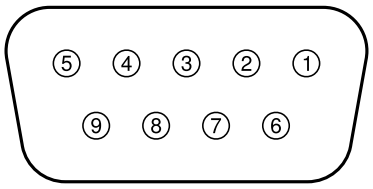

Figure 40: DB9F Console Connector Pinout

Table: WiN7000 Console Connector Pinout

3-Pin Connector Pin Number	DB9F Connector Pin Number	Connection
1	2	TX
3	3	RX
4	5	GND

WiN7000 Specifications

Radio and Modem:

- Frequency, by Base Station model number:
  - WiN7023: 2300 MHz to 2400 MHz
  - WiN7025: 2496 MHz to 2690 MHz
  - WiN7035: 3400 MHz to 3600 MHz
  - WiN7015: 1400 MHz to 1520 MHz
  - WiN7018: 1800 MHz to 1830 MHz
- IEEE802.16-2005 (16e OFDMA)
- WiMAX Forum Wave 2 Profile
- Time Division Duplex (TDD)
- Channel Bandwidth (MHz) 3.5, 5, 7, 10
- Frequency Resolution 0.25 MHz
- Diversity Support 2x2, STC/MIMO-SM
- FEC Convolution Code and Turbo Code
- Transmit Power Control
- Output Power (average) 2 X 36 dBm
- Modulation 512/1024 FFT points; QPSK, 16QAM, 64QAM

Radio Interfaces:

- Number of Antennas: 2
- Antenna Connectors 2 × N-Type, 50 ohm
- Integrated or External Sector or Omni Antenna
- Built-in GPS included

Network Interfaces:

- 10/100BaseT Half/Full Duplex IEEE 802.3 CSMA/CD
- ASN GW Compatibility WiMAX Forum R6, Profile C
- Compatible with Cisco and WiChorus ASN-GW
- Fiber Optic (Optional)

Configuration and Management:

- Web GUI
- Management SNMP
- SNMP Agent SNMP ver 2 client/v3
- Software Upgrade via FTP, SFTP
- Remote Configuration via FTP, SFTP

Mechanical:

- Dimensions [H × W × D] 756 mm × 290mm × 195 mm
- Weight <15kg

Power Interface:

- Power supply Input
  - 85-265VAC
  - 37-60VDC

    (customer supplied for SFD version)
- Power Consumption 120W max

Standards Compliance

EMC:

- FCC part 15, subpart B, class A
- ETSI EN 301 489-1 V1.8.1
- ETSI EN 301 489-4 V1.3.1
- 1613 section 6.3, 7, 8, 9 Class 1
- IEC 61850-3 section 5.7, 5.8
- EN55022

Safety:

- EN60950-22
- TUV 60950-1
- IEC 60950-1
- 1613 Section 5, 6.2
- IEC 60255-5 section 6.14

Environmental:

- Operating Temperature: -40°C to +65°C
- Operating Humidity: 5% to 95% non condensing
- Weather protected: IP67
- IEC 61850-3 section 5.2, 5.3, 5.5
- IEC 870-2-2 section 3
- Corrosion: MIL-STD-810F 509.4 - salt fog

Radio:

- FCC: 47CFR Part 15, Part 27, Part 90 Subpart B
- IC: SRSP 301.7 Issue 24

List of Acronyms

Table: List of Acronyms

Acronym	Description
ASN	Access Service Network
BST	Base Station
IP	Internet Protocol
LAN	Local Area Network
LOS	Line-of-sight
MIMO	Multiple-Input, Multiple-Output
NMS	Network Management System
NLOS	Non-line-of-sight
RF	Radio Frequency
WiMAX	Worldwide Interoperability for Microwave Access
RUGGEDCOM	RUGGEDCOM WiMAX Product Family
RUGGEDCOM NMS	RUGGEDCOM Network Management System

Warranty

Siemens warrants this product for a period of five (5) years from the date of purchase. This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void. For warranty details, visit www.siemens.com/ruggedcom or contact your customer service representative.

Should this product require service, contact the factory at:

Siemens AG
300 Applewood Crescent
Concord, Ontario
Canada L4K 5C7
Phone: +1 905 856 5288
Fax: +1 905 856 1995